

524,506

Rec'd PCT TTO 14 FEB 2005

(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property
Organization
International Bureau



(43) International Publication Date
26 February 2004 (26.02.2004)

PCT

(10) International Publication Number
WO 2004/017329 A1

(51) International Patent Classification⁷: G12B 21/08,
21/20, 21/02, G01D 5/26, 5/353

(74) Agent: E. BLUM & CO.; Vorderberg 11, CH-8004 Zurich
(CH).

(21) International Application Number:

PCT/IB2002/003253

(22) International Filing Date: 14 August 2002 (14.08.2002)

(25) Filing Language: English

(26) Publication Language: English

(71) Applicant (for all designated States except US): UNIVERSITÄT BASEL [CH/CH]; Petersgraben 35, CH-4003 Basel (CH).

(72) Inventors; and

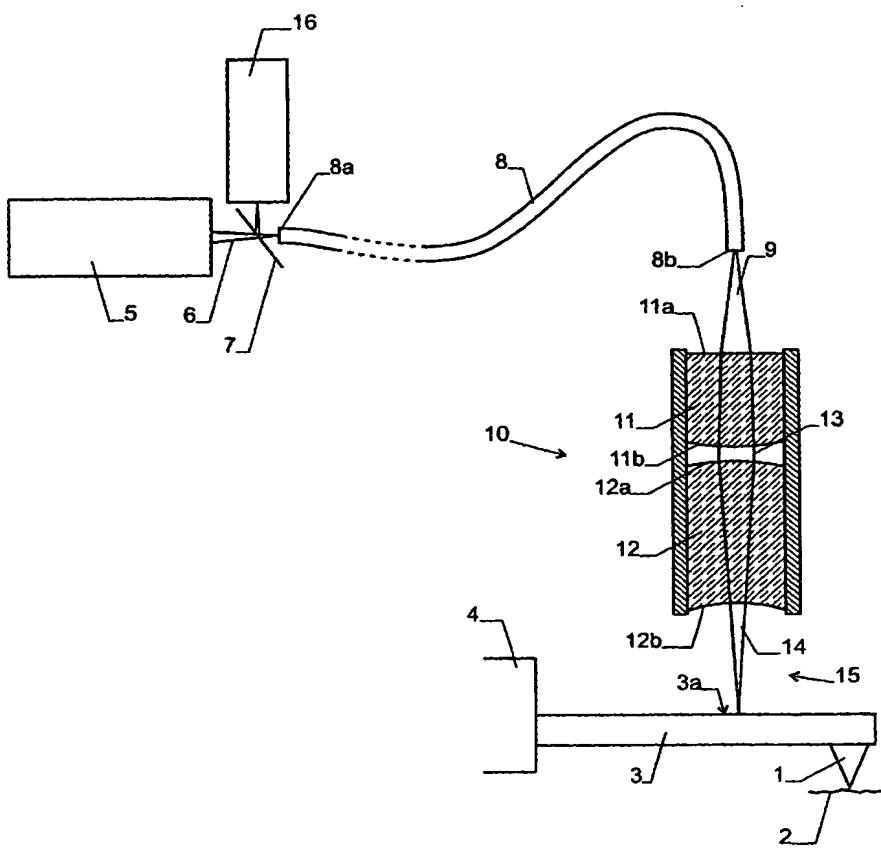
(75) Inventors/Applicants (for US only): FREDERIX, Patrick, Louis, Theodorus, Martin [NL/CH]; Wendenlgasse 3, CH-4125 Riehen (CH). HUG, Hans, Josef [CH/CH]; Kindergartenstrasse 12, CH-4153 Reinach (CH).

(81) Designated States (national): AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NO, NZ, OM, PH, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW.

(84) Designated States (regional): ARIPO patent (GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE, SK, TR), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

[Continued on next page]

(54) Title: SENSOR WITH CANTILEVER AND OPTICAL RESONATOR



(57) Abstract: An optical sensor, in particular for a scanning force microscope, measures the deflection of a cantilever (3) using an optical resonator between the cantilever (3) and an output surface (12b) of a lens assembly (10). In order to form the resonator, output surface (12b) is concave and parallel to the wavefronts of the light within the resonator. This design provides a resonator of high stability and allows to keep the distance between lens assembly (10) and cantilever (3) comparatively large.

WO 2004/017329 A1



Published:

— *with international search report*

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

INTERNATIONAL SEARCH REPORT

PCT/IB 02/03253

A. CLASSIFICATION OF SUBJECT MATTER

IPC 7 G12B21/08 G12B21/20 G12B21/02 G01D5/26 G01D5/353

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 7 G12B G01D G01B

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

EPO-Internal, WPI Data, PAJ, INSPEC, COMPENDEX

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 2002/000511 A1 (SCHAFFER TILMAN E ET AL) 3 January 2002 (2002-01-03) figures 3-6 paragraphs '0028!-'0034! ---	1-12
A	US 5 166 516 A (KAJIMURA HIROSHI) 24 November 1992 (1992-11-24) figures 1,3 column 3, line 30 -column 4, line 37 ---	1-12
A	EP 0 557 743 A (IBM) 1 September 1993 (1993-09-01) figure 1 column 4, line 22 -column 5, line 14 ---	1-12 -/-

 Further documents are listed in the continuation of box C. Patent family members are listed in annex.

° Special categories of cited documents :

- "A" document defining the general state of the art which is not considered to be of particular relevance
- "E" earlier document but published on or after the International filing date
- "L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
- "O" document referring to an oral disclosure, use, exhibition or other means
- "P" document published prior to the International filing date but later than the priority date claimed

- "T" later document published after the International filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
- "X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
- "Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.
- "&" document member of the same patent family

Date of the actual completion of the International search

Date of mailing of the International search report

8 April 2003

17/04/2003

Name and mailing address of the ISA

European Patent Office, P.B. 5818 Patentlaan 2
 NL - 2280 HV Rijswijk
 Tel. (+31-70) 340-2040, Tx. 31 651 epo nl,
 Fax: (+31-70) 340-3016

Authorized officer

Polesello, P

INTERNATIONAL SEARCH REPORT

PCT/IB 02/03253

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 5 560 244 A (PRATER CRAIG B ET AL) 1 October 1996 (1996-10-01) figures 4-13 column 7, line 10 -column 13, line 30 -----	1-12

INTERNATIONAL SEARCH REPORT

PCT/IB 02/03253

*Patent document cited in search report		Publication date		Patent family member(s)		Publication date
US 2002000511	A1	03-01-2002	US	2002195553 A1		26-12-2002
US 5166516	A	24-11-1992	JP	4161807 A		05-06-1992
EP 0557743	A	01-09-1993	US	5280341 A		18-01-1994
			EP	0557743 A1		01-09-1993
			JP	6042909 A		18-02-1994
			JP	8020205 B		04-03-1996
US 5560244	A	01-10-1996	US	5463897 A		07-11-1995
			US	6032518 A		07-03-2000
			US	5714682 A		03-02-1998